

**WEST**☐ Generate Collection

L5: Entry 16 of 42

File: USPT

Jan 17, 1995

US-PAT-NO: 5382810

DOCUMENT-IDENTIFIER: US 5382810 A

TITLE: Optoelectronic component

DATE-ISSUED: January 17, 1995

## INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Isaksson; Jan	Taby	N/A	N/A	SEX

US-CL-CURRENT: 257/81; 257/433, 257/435, 257/98, 257/99

## CLAIMS:

## I claim:

1. An optoelectronic component comprising at least one light-emitting or light-receiving semiconductor element which is arranged on a base, and a housing surrounding the base and forming together therewith a closed casing for said at least one semiconductor element, wherein the component comprises a building block having a plurality of legs shaped such that, when fitting the housing on the base, the legs are clamped between the base and the housing for centering and locking the housing in relation to the base.
2. An optoelectronic component according to claim 1, wherein the building block consists of a metal plate.
3. An optoelectronic component according to claim 2, wherein the legs consist of folded-down parts of the metal plate.
4. An optoelectronic component according to claim 1, comprising two semiconductor elements arranged on the base, wherein the building block has a screen portion, arranged between the semiconductor elements, which is designed so as to prevent direct light transmission between the elements.
5. An optoelectronic component according to claim 4, wherein the screen portion consists of a bent-down part of the metal plate.
6. An optoelectronic component according to claim 1, wherein the building block is provided with wholly or partially reflecting parts for guiding the direction of light emitted from or falling against said at least one semiconductor element.
7. An optoelectronic component according to claim 6, wherein the wholly or partially reflecting parts consist of a mirror mounted on the building block.
8. An optoelectronic component according to claim 6, wherein said reflecting parts consist of one or more reflecting surfaces of the building block.
9. An optoelectronic component according to claim 6, wherein said at least one semiconductor element comprises a first light-emitting semiconductor element and a second light-receiving semiconductor element for optical transmission of signals from the first to the second semiconductor element, wherein said reflecting parts of the building block are adapted for reflection of light emitted from the first semiconductor element toward the second semiconductor element.
10. An optoelectronic component according to claim 6, in which the housing has at least one opening for light transmission between said at least one semiconductor element and the surroundings, wherein the wholly or partially reflecting parts of the building block are adapted for guiding the path of the light between said at least one semiconductor element and the opening.
11. An optoelectronic component according to claim 1, wherein said at least one semiconductor element comprises a light-emitting semiconductor element and a light-receiving semiconductor element which transmit light therebetween through a common opening in the housing, wherein the building block has partially reflecting members, arranged in the light transmission path between said light-emitting

semiconductor element and said light-receiving semiconductor element and the opening, for guiding the path of the light between the two semiconductor elements and the opening.

12. An optoelectronic component according to claim 11, wherein the partially reflecting member is arranged in the direct light path between one of the semiconductor elements and the opening and at an angle with said light path, and that the building block has a reflecting member arranged in the light path between the other semiconductor element and the partially reflecting member.

13. An optoelectronic component according to claim 1, in which said at least one semiconductor element either emits or receives light through at least two different openings in the housing, wherein the building block is provided with partially reflecting members for guiding the path of the light between the semiconductor element and the openings.

14. An optoelectronic component according to claim 11, wherein the partially reflecting member consists of a partially reflecting mirror.

15. An optoelectronic component according to claim 14, wherein the mirror consists of a glass plate.

16. An optoelectronic component according to claim 11, wherein the partially reflecting member consists of a reflecting portion of the building block provided with a plurality of openings.

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File 351:DERWENT WPI 1963-2000/UD=, UM=, & UP=200026

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now in ONTAP File 280. See HELP NEWS 280 for details.

Set Items Description

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?s pn=ep 230336

S1 1 PN=EP 230336

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DIALOG(R)File 351:DERWENT WPI

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007210609

WPI Acc No: 87-207618/198730

XRPX Acc No: N87-155390

Sealed surface mount optoelectronic device - has protruding spherical  
lens glued into annular spacer which surrounds electroluminescent element  
bonded to face of substrate

Patent Assignee: RTC-COMPELEC (PHIG ); PHILIPS GLOEILAMPEN NV (PHIG )

Inventor: THILLAYS J

Number of Countries: 005 Number of Patents: 007

Patent Family:

Patent No	Kind	Date	Applicat No	Kind	Date	Main IPC	Week
EP 230336	A	19870729	EP 87200070	A	19870119		198730 B
FR 2593930	A	19870807					198738
JP 62190777	A	19870820	JP 8710118	A	19870121		198739
US 4727457	A	19880223	US 86910105	A	19860922		198811
EP 230336	B	19910410					199115
DE 3769158	G	19910516					199121
KR 9500110	B1	19950109	KR 87447	A	19870121	H01L-033/00	199644

Priority Applications (No Type Date): FR 861028 A 19860124

Cited Patents: 2.Jnl.Ref; EP 143040; GB 2122418; JP 58225673; US 4301461;  
WO 8204500

Patent Details:

Patent	Kind	Lan	Pg	Filing Notes	Application	Patent
EP 230336	A	F	6			
US 4727457	A		6			

Abstract (Basic): EP 230336 A

The electroluminescent element e.g. LED (20) is bonded to one tab  
(35) of a conductive layer (5) on the upper surface of a ceramic  
substrate (1). Another tab (34) connects a wire from a device terminal  
(32) to another conductive layer (9). The two layers (5,9) are  
continuous with contacts (8,11) on the underside (3) of the substrate.

The lens (40) of e.g. ruby or sapphire is glued into an annular  
spacer (21) of smaller dia. such that the plane of emission (50) from

the LED, (20) is distanced (d) from the face of the lens (40) by not more than its focal length (T) in the transparent glue (22). The lens serves a dual function of optical directivity and mechanical closure.

ADVANTAGE - Sealed surface mount device of high optical quality is easily assembled from min. number of parts.

/4

Title Terms: SEAL; SURFACE; MOUNT; DEVICE; PROTRUDE; SPHERE; LENS; GLUE; ANNULAR; SPACE; SURROUND; ELECTROLUMINESCENT; ELEMENT; BOND; FACE; SUBSTRATE

Derwent Class: P81; Q71; U11; U12

International Patent Class (Main): H01L-033/00

International Patent Class (Additional): F21V-007/04; G02B-006/32;

G02B-007/02; G02B-027/30; H01L-031/02

File Segment: EPI; EngPI

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L3: Entry 2 of 3

File: USPT

Feb 5, 1991

US-PAT-NO: 4989935

DOCUMENT-IDENTIFIER: US 4989935 A

TITLE: Optoelectronic transmitter and receiver

DATE-ISSUED: February 5, 1991

## INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Stein; Karl-Ulrich	Unterhaching	N/A	N/A	DEX

US-CL-CURRENT: 250/551; 250/227.23, 257/81, 257/84, 385/49, 385/95

## CLAIMS:

I claim as my invention:

1. An optoelectronic transmitter and receiver device on a silicon wafer, comprising:  
an optical transmitter inserted into the silicon wafer and formed of a laser composed of III/V compound semiconductor material;  
an optical receiver inserted into the silicon wafer and formed of a receptor diode;  
a controller monolithically integrated in the silicon wafer including:  
a drive circuit means for driving said optical transmitter;  
a pre-amplifier circuit means for amplifying output signals from said optical receiver;  
coupling optics on the silicon wafer having a connection for an optical fiber;  
light guides monolithically integrated in the silicon wafer and connected between said coupling optics and said optical transmitter and said optical receiver; and  
a wavelength selective beam splitter in said light guides between said coupling optics and said optical transmitter and said optical receiver for beam splitting, said beam splitter being monolithically integrated into the silicon wafer.
2. An optoelectronic transmitter and receiver device as claimed in claim 1, wherein said light guides are formed as silicon ridges on the silicon wafer.
3. An optoelectronic transmitter and receiver device as claimed in claim 2, wherein said light guides have optically active doped layers in the silicon wafer.
4. An optoelectronic transmitter and receiver device as claimed in claim 2, wherein said light guides have silicon/oxide/oxinitride layers on the silicon wafer.
5. An optoelectronic transmitter and receiver device as claimed in claim 1, wherein said light guides are formed as strip lines on the silicon wafer.
6. An optoelectronic transmitter and receiver device as claimed in claim 5, wherein said light guides have optically active doped layers in the silicon wafer.
7. An optoelectronic transmitter and receiver device as claimed in claim 5, wherein said light guides have silicon/oxide/oxinitride layers on the silicon wafer.
8. An optoelectronic transmitter and receiver device as claimed in claim 1, wherein said coupling optics includes a groove in said silicon wafer adapted for fastening a connecting fiber, said groove being in combination with said light guides.
9. An optoelectronic transmitter and receiver device as claimed in claim 1, wherein said coupling optics is a means for butt-coupling a fiber to said device.
10. An optoelectronic transmitter and receiver device as claimed in claim 1, wherein said coupling optics includes a bonded fiber splice connection having said

light guides formed with a tongue at an end.

11. An optoelectronic transmitter and receiver device as claimed in claim 1, wherein said wavelength selective beam splitter is a directional coupler.

12. An optoelectronic transmitter and receiver device as claimed in claim 1, wherein said wavelength selective beam splitter is a surface grating.

13. An optoelectronic transmitter and receiver device as claimed in claim 1, further comprising:

a monitor diode integrated into said controller for measuring and converting light power.

14. An optoelectronic transmitter and receiver device as claimed in claim 1, further comprising:

a bolometer integrated into said controller for measuring and converting light power.

15. An optoelectronic transmitter and receiver device as claimed in claim 1, further comprising:

electronic interconnects integrated into said silicon wafer using integrated circuit technology.

16. An optoelectronic transmitter and receiver device as claimed in claim 1, further comprising:

means for amplifying electrical signals in said device, said means for amplifying being monolithically integrated into said silicon wafer.

17. An optoelectronic transmitter and receiver device as claimed in claim 16, wherein said means for amplifying includes transistors in metal-semiconductor-PtSi technology.

18. An optoelectronic transmitter and receiver device as claimed in claim 16, wherein said means for amplifying includes broad band amplifiers.

19. An optoelectronic transmitter and receiver device as claimed in claim 1, wherein said III/V compound semiconductor material is InP/InGaAsP.

20. An optoelectronic transmitter and receiver device as claimed in claim 1, wherein said drive circuit is integrated into said laser of said optical transmitter.

21. An optoelectronic transmitter and receiver device as claimed in claim 1, wherein said pre-amplifier circuit is integrated into said receptor diode of said optical receiver.

22. An optoelectronic transmitter and receiver device as claimed in claim 1, wherein said receptor diode is a metal-semiconductor platinum silicide Schottky barrier diode monolithically integrated in the silicon wafer.

23. An optoelectronic transmitter and receiver device as claimed in claim 1, further comprising:

a monitor diode which is a metal-semiconductor platinum silicide Schottky barrier diode monolithically integrated in the silicon wafer, said monitor diode being disposed to monitor output from said optical transmitter.

24. An optoelectronic transmitter and receiver device as claimed in claim 1, further comprising:

a bottom plate applied onto a bottom of said optoelectronic transmitter and receiver device;

means for encapsulating said optoelectronic transmitter and receiver device and a light wave guide connected thereto.

25. An optoelectronic transmitter and receiver device as claimed in claim 1, further comprising:

a lead frame applied onto a bottom of said optoelectronic transmitter and receiver device; and

means for encapsulating said optoelectronic transmitter and receiver device and a light wave guide connected thereto.

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L4: Entry 6 of 73

File: USPT

Nov 9, 1999

US-PAT-NO: 5981945

DOCUMENT-IDENTIFIER: US 5981945 A

TITLE: Optoelectronic transducer formed of a semiconductor component and a lens system

DATE-ISSUED: November 9, 1999

## INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Spaeth; Werner	Holzkirchen	N/A	N/A	DEX
Gramann; Wolfgang	Regensburg	N/A	N/A	DEX
Bogner; Georg	Regensburg	N/A	N/A	DEX
Dietrich; Ralf	Munchen	N/A	N/A	DEX

US-CL-CURRENT: 250/239; 250/216, 257/81

## CLAIMS:

We claim:

1. An optoelectronic transducer, comprising:  
a base plate having a surface with lands formed thereon;  
a radiation-emitting or transmitting semiconductor component disposed between said lands on said base plate and having a top surface;  
an optical lens system aimed at said semiconductor component, an entire area of said top surface of said radiation-emitting or transmitting semiconductor component having a direct and unobstructed path to said optical lens system; and  
a spacer supported on said lands of said base plate for supporting said lens system;  
said base plate, said spacer and said lens system being formed of materials with at least similar coefficients of thermal expansion.
2. The transducer according to claim 1, wherein said base plate and said lens system are formed of silicon and said spacer is formed of glass.
3. The transducer according to claim 1, wherein said base plate is formed of glass and said lens system and said spacer are formed of silicon.
4. The transducer according to claim 1, wherein said base plate has a metal layer on which said semiconductor component is secured.
5. The transducer according to claim 2, wherein said spacer formed of glass is joined to said base plate and said lens system formed of silicon, by anodic bonding.
6. The transducer according to claim 3, wherein said base plate formed of glass is joined to said lens system and said spacer formed of silicon, by anodic bonding.
7. The transducer according to claim 2, wherein said spacer formed of glass is joined to said base plate and said lens system formed of silicon by soldering.
8. The transducer according to claim 3, wherein said base plate formed of glass is joined to said lens system and said spacer formed of silicon by soldering.
9. The transducer according to claim 2, wherein said spacer formed of glass is joined to said base plate and said lens system formed of silicon by adhesive bonding.
10. The transducer according to claim 3, wherein said base plate formed of glass is joined to said lens system and said spacer formed of silicon by adhesive bonding.
11. The transducer according to claim 1, wherein said semiconductor component is seated in an indentation formed in said base plate.
12. The transducer according to claim 1, including a glass plate, said base plate

being formed of silicon and having a side remote from said semiconductor component being joined to said glass plate.

13. The transducer according to claim 1, wherein said surface of said base plate has an indentation formed between said lands, and said semiconductor component is disposed in said indentation.

14. The transducer according to claim 1, wherein said base plate, said spacer and said lens system are entirely formed of materials with at least similar coefficients of thermal expansion.

15. An optoelectronic transducer system, comprising:

an optoelectronic transducer, including:

a base plate having a surface with lands formed thereon;

a radiation-emitting or transmitting semiconductor component disposed between said lands on said base plate;

an optical lens system aimed at said semiconductor component; and

a spacer disposed on said lands and extending from said base plate and supporting said lens system, said spacer formed of glass with a given coefficient of thermal expansion and said base plate having a coefficient of thermal expansion substantially similar to said given coefficient of thermal expansion of said spacer.

16. The transducer system according to claim 15, including a housing having a base and a cap with a window, said optoelectronic transducer is secured to said base relative to said window of said cap, and a coupling disposed on said housing for receiving and securing a light wave conductor to said housing.

17. The transducer according to claim 16, wherein said transducer is adjustable relative to said window.



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S3 1 PN=EP 374121

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DIALOG(R)File 351:DERWENT WPI

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008300464 \*\*Image available\*\*

WPI Acc No: 90-187465/199025

XRPX Acc No: N90-145783

**Light-emitting diode for opto-electronic length or angle measurement -  
has diode supported by conductive carrier and enclosed by opaque material  
for preventing stray light**

Patent Assignee: RSF-ELEKTRONIK GMBH (RSFE-N)

Inventor: RIEDER H; SCHWAIGER M

Number of Countries: 010 Number of Patents: 001

Patent Family:

Patent No	Kind	Date	Applicat No	Kind	Date	Main IPC	Week
EP 374121	A	19900620	EP 89890285	A	19891031		199025 B

Priority Applications (No Type Date): AT 883069 A 19881216

Cited Patents: 2.Jnl.Ref; A3...9103; DE 2544398; EP 147514; GB 1383548; JP  
58056483; JP 59112668; NoSR.Pub; US 4375606

Patent Details:

Patent	Kind	Lan	Pg	Filing Notes	Application	Patent
EP 374121	A					

Designated States (Regional): BE CH DE FR GB IT LI LU NL SE

Abstract (Basic): EP 374121 A

The light-emitting diode has an electrically conductive carrier (1) supporting the diode (7) and acting as one of its terminal contacts.

The other is provided by an innulated contact pin (9) fitted through the carrier an connected to the diode via a lead (8) on the upper side of the carrier (1). The latter extends beyond the diode (7) on all sides and supports a transparent cover (13) enclosing the diode (7).

The diode is inserted in a sealing (5) provided in the. surface of the carrier (1) with a free space on all sides of it. This is filled with an opaque material, e.g. a resin mass (12). The sides of the seating pref. taper outwards from the base (6).

ADVANTAGE - Reduces stray light output to sides. (4pp Dwg.No.1/1)

Title Terms: LIGHT; EMIT; DIODE; OPTO; ELECTRONIC; LENGTH; ANGLE; MEASURE;  
DIODE; SUPPORT; CONDUCTING; CARRY; ENCLOSE; OPAQUE; MATERIAL; PREVENT;  
STRAY; LIGHT

Derwent Class: U12

International Patent Class (Additional): H01L-033/00

File Segment: EPI

?s pn=ep 400176  
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DIALOG(R)File 351:DERWENT WPI  
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008475801 \*\*Image available\*\*  
WPI Acc No: 90-362801/199049  
XRPX Acc No: N90-276839

**Surface-mounted opto-electronic element - has optical lens fitted over  
mounting base supporting transmitter or receiver element**

Patent Assignee: SIEMENS AG (SIEI )  
Inventor: SCHELLHORN F; WAITL G  
Number of Countries: 015 Number of Patents: 003  
Patent Family:

Patent No	Kind	Date	Applicat No	Kind	Date	Main IPC	Week
EP 400176	A	19901205	EP 89109835	A	19890531		199049 B
JP 3011771	A	19910121					199109
US 5040868	A	19910820	US 90531459	A	19900531		199136

Priority Applications (No Type Date): EP 89109835 A 19890531  
Cited Patents: 1.Jnl.Ref; DE 3703423; EP 230336; FR 2520935; US 4000437; US  
4439006; WO 8300408

Patent Details:

Patent	Kind	Lan	Pg	Filing Notes	Application	Patent
EP 400176	A					

Designated States (Regional): AT BE CH DE ES FR GB GR IT LI LU NL SE

Abstract (Basic): EP 400176 A

The surface-mounted optoelectronic element has a mounting base (1) supporting an optical transmitter or receiver (8) which is enclosed by an optical lens element (9), for the transmitted or received light. The lens element (9) is adjusted relative to the transmitter or receiver via alignment elements (3).

Pref. the mounting base (1) incorporates a reflector (5) provided by a mirrored recess locating the optical transmitter or receiver (8). The alignment elements (9) are pref. provided by pins projecting from the rear face of the lens element (9) and fitting into corresponding holes in the top face of the mounting base (1).

ADVANTAGE - Flexible application. (19pp Dwg.No.4/23)

Title Terms: SURFACE; MOUNT; OPTO; ELECTRONIC; ELEMENT; OPTICAL; LENS; FIT; MOUNT; BASE; SUPPORT; TRANSMIT; RECEIVE; ELEMENT

Derwent Class: P81; P85; U12; V07

International Patent Class (Additional): G02B-006/42; G09F-009/33;

H01L-031/02; H01L-033/00

File Segment: EPI; EngPI

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DIALOG(R)File 351:DERWENT WPI  
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003569668

WPI Acc No: 83-B7858K/198306

XRPX Acc No: N83-023127

**Opto-electronic component housing - has LED on end-capped base with domed transparent cover**

Patent Assignee: SIEG J (SIEG-I)

Inventor: REINHOLD W

Number of Countries: 011 Number of Patents: 006

Patent Family:

Patent No	Kind	Date	Applicat No	Kind	Date	Main IPC	Week
DE 3128187	A	19830203					198306 B
WO 8300408	A	19830203					198307
JP 58500880	W	19830526					198327
EP 83627	A	19830720	EP 82902954	A	19820716		198330
EP 83627	B	19851030					198544
DE 3267157	G	19851205					198550

Priority Applications (No Type Date): DE 3128187 A 19810716

Cited Patents: CA 1016679; DE 2227322; DE 2650770; FR 1490665; GB 1258660;

GB 1440274; GB 2002959; US 3911430; US 4168102

Patent Details:

Patent	Kind	Lan	Pg	Filing Notes	Application	Patent
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DE 3128187	A		17			
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WO 8300408	A	G				
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Designated States (National): JP US

Designated States (Regional): AT BE CH DE FR GB NL SE

EP 83627	A	G				
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Designated States (Regional): AT BE CH DE FR GB LI NL SE

EP 83627	B	G				
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Designated States (Regional): AT BE CH DE FR GB LI NL SE

Abstract (Basic): DE 3128187 A

The component offers low prodn. cost and versatility for various user applications. The device has an opto-electronic body (2) on a base (3) of insulating material. Two terminal contacts (4,5) are capped over the ends of the insulator base (3).

The opto-electronic body (2) has one end connected to one end cap (5) to form a terminal (5a) and the conducting adhesive (6) at its base connected to the second end cap (4, 4a). The base (3) is 1.27 mm wide at most and is covered by a transparent dome (8). The semiconductor (2) is a LED.

1/8

Title Terms: OPTO; ELECTRONIC; COMPONENT; HOUSING; LED; END; CAP; BASE; DOME; TRANSPARENT; COVER

Derwent Class: T04; U11; U12

International Patent Class (Additional): G06K-007/10; H01L-031/08;

H01L-033/00

File Segment: EPI

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Sub account: P001086

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